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A Graphic Method of Solving Spherical Triangles.

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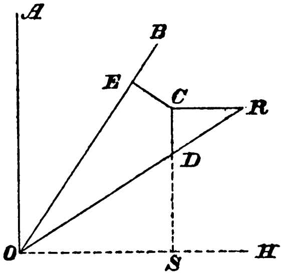
AOB and AOR are respectively equal to the sides c and b of a spherical triangle, OD is the natural cosine of the included angle A, OE is the natural cosine of the third side a, and OR is the radius of the natural tables; DC is drawn parallel to OA, RC perpendicular to OA, and EC perpendicular to OB. It may readily be shown that these three lines meet in C, which is the orthographic projection of the triangular vertex C on the plane of the side c.



With AOB and AOR given, it is evident that if either OD or OE is known, the other may be found, and if both are known together with AOR, the two values of AOB then possible may be found by drawing from C tangents to an arc which has O as center and the given length of OE as radius.

(The constructions on OB and OR may be exchanged.)

Thus a spherical triangle may be solved when there are given three sides, two sides and included angle, or two sides and angle opposite one of them; and the three remaining cases of the spherical triangle may be solved through the three just named which are polar to them.

When great accuracy is not required, it is believed that the method here sketched will be found useful, on account of its simplicity and the ease with which it may be applied.

Thus, to find the distance between two places whose latitudes and longitudes are known, take *HOR* and *HOB* the latitudes and *OD* the cosine of the difference of longitude, then through *D* draw *SC* the sine of *HOR* and *CE* perpendicular to *OB*; *OE* is the cosine of the great circle arc between the places.

To reduce a sextant-angle to the horizon, take *HOR* and *HOB* the angular altitudes of the two points in space, *OE* the cosine of the measured angle between them, and *OR* the radius of the natural tables, then draw *EC* perpendicular to *OB*, and *RC* parallel to *OH*, and *CD* perpendicular to *OH*; *OD* is the cosine of the horizontal angle required.

The construction last mentioned gives also the cosine of the angle between an hour circle through a heavenly body whose declination and altitude are known, and the meridian of a place whose latitude is known. In this case *OE* is the sine of the altitude, and of course is zero for an observation at the horizon.

Other applications will readily occur.